ABSTRACT

~~The present invention realizes a~~ A quantum circuit and a quantum computer are capable of performing multi-bit quantum computation. In the quantum circuit, a [[A]] quantum bit is represented by [[the]] polarization directions of light, a sequence of polarized light pulses representing a quantum bit string is sequentially supplied to the quantum circuit, and [[the]] an amount of polarization rotation and phase difference applied to a certain light pulse ~~and the amount of phase difference~~ are determined on the basis of a result of ~~the measurement of~~ a polarization measurement of [[the]] a preceding input light pulse sequence, thus realizing a controlled-unitary transform. In addition, regarding the light pulses representing the quantum bits, the number of photons included in one pulse is larger than 1, resulting in a reduction of the influence of error.